National Aeronautics and
Space Administration

NOT MEASUREMENT
SENSITIVE

NASA-STD-2804H
September 21, 2004

MINIMUM INTEROPERABILITY SOFTWARE SUITE

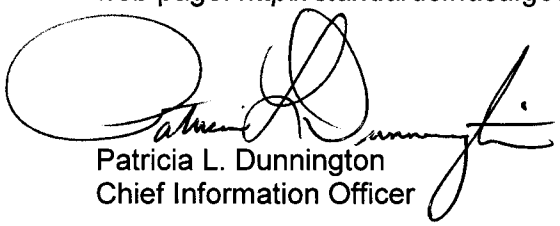
NASA TECHNICAL STANDARD

FOREWORD

This standard is approved for use by NASA Headquarters and all NASA Centers and is intended to provide a common framework for consistent practices across NASA programs.

The material covered in this standard is based on the consensus judgment of the NASA Chief Information Officers (CIO) Board and the NASA IT Investment Council. The purpose of this standard is to establish the minimum workstation software suite required to support interoperability, establish interface and product standards for components of the software suite operating on PC, Macintosh, and Unix systems, and establish reporting metrics for determining overall NASA interoperability.

Requests for information, corrections, or additions to this standard should be directed to the John Glenn Research Center (GRC), the Basic Interoperability and Desktop Standards Group, Code 7100, MS 142-5, Cleveland, OH, 44135 or to *desktop-standards@grc.nasa.gov*. Requests for general information concerning standards should be sent to NASA Technical Standards Program Office, ED41, MSFC, AL, 35812 (telephone 256-544-2448). This and other NASA standards may be viewed and downloaded, free of charge, from our NASA Standards web page: *http://standards.nasa.gov/*.



Patricia L. Dunnington
Chief Information Officer

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1 SCOPE

1.1 Purpose and Scope

This standard establishes the minimum software suite required to support interoperability; establishes interface and product standards for components of the software suite operating on PC, Macintosh, and Unix systems; and establishes reporting metrics for determining overall NASA interoperability.

1.2 Applicability

Center CIO's will ensure that all NASA employees at their respective centers have access to an interoperable workstation that is equipped with a minimum software suite that meets the standards listed in Section 3 below.

For the functions (components) identified with standard products, future procurements to support interoperability are restricted to these products and enterprise applications. Licenses for other products may not be renewed. Additional products will be added as required.

1.3 Waivers

The waiver process set forth in NPG 2800.1, paragraph 2.2.4, applies to this standard. The desktop standards group, in cooperation with the Chief Technical Officer, will continue to process waivers on behalf of the Principal Center for Workgroup Hardware and Software.

2 ACRONYMS AND DEFINITIONS

2.1 Acronyms

CIO	Chief Information Officer
FTP	File Transfer Protocol
GIF	Graphics Interchange Format
HTML	Hypertext Markup Language
ICA	Independent Computing Architecture
ICE	Integrated Cryptographic Engine
JPEG	Joint Photographic Experts Group
JRE	Java Runtime Environment
MIME	Multipurpose Internet Mail Extension
PDF	Portable Document Format
PKI	Public Key Infrastructure
SMTP	Simple Mail Transport Protocol
TCP/IP	Transmission Control Protocol/Internet Protocol

2.2 Definitions

2.2.1 Minimum Workstation to Support Basic Interoperability

Workstations that support basic interoperability are defined by being networked, and by having users who exchange information electronically, including those users that perform any or all of the activities encompassed in the minimum office automation software suite defined below.

Portable workstations that support basic interoperability are defined by having network capability using a network interface or modem, in addition to the minimum workstation criteria specified above.

3 DETAILED REQUIREMENTS

3.1 Architectural Compliance Requirements

NASA has baselined and approved an initial NASA Integrated Information Technology Architecture[1]. The architecture is predicated on:

- the selection of standards for a broad and cost-effective infrastructure using commercial off-the-shelf and well-supported open source products as much as possible
- interoperability both within and external to NASA
- flexibility for future growth
- consistency with generally accepted consensus standards as much as feasible.

Among these objectives, interoperability is one of NASA's most critical issues related to information technology.

At times, it is in NASA's best interest to specify commercial products as standards for an interoperable implementation of a particular set of related and integrated functions. In those instances, there are often other embedded functions or proprietary extensions within those products whose use may create higher-level interoperability conflicts when embedded in an application system that transcends basic interoperability. **For that reason, NASA Centers and programs are advised to apply appropriate caution to the use of proprietary or non-standard extensions, features and functions of hardware or software that go beyond the standard functionality**.

3.2 Interface and Product Standards.

The following standards are established for the components of the basic interoperability software suite:

Component	Interface standard	Product standard
Word processing	Microsoft Word file[2]	Microsoft Word
Spreadsheet	Microsoft Excel file	Microsoft Excel
Presentation	Microsoft PowerPoint file	Microsoft PowerPoint
Electronic mail	NASA-STD-2815, *Electronic messaging architecture, standards and products*, which references RFC1939 (POP3) and RFC2060 (IMAP4).	Windows: Microsoft Outlook(according to version of MS Office in use), Eudora Pro 6.1 Mac OS X: Eudora Pro 6.1 Unix: Mozilla Mail 1.7

[1] NASA-STD-2814A, *NASA Integrated Information Technology Architecture—Technical Framework*

[2] The Microsoft Office file formats are the ones used in Office 97. Office 2000, Office XP, and Office 2003/2004 use this same format.

Component	Interface standard	Product standard
Web browser	W3C and industry standards, including the following: HTML 4.01 XHTML 1.0 CSS (Cascading Style Sheets) ECMAscript (JavaScript) capability to run Java 2 applets SSL version 2 and 3 using 128 bit RC4 encryption and the MD5 message digest algorithm. See NASA-STD-2820, *Encryption and Digital Signature Standards.*	Windows: Internet Explorer 6 and Mozilla 1.7 Mac OS X: Internet Explorer 5.2.3 and Mozilla 1.7, and Safari 1.2.2 (or later) Other Unix: Mozilla 1.7
PDF viewer	PDF file	Adobe Reader (6.0 or higher) or other comparable PDF viewer
Calendar/scheduling	iCalendar (RFC 2445)[3]	none specified[4]
Access to centrally-served Windows applications	Citrix ICA protocol	Citrix ICA client Windows: 6.31 Mac OS X 6.30 (or later versions)
Electronic forms	NASA-STD-2809, *NASA Intelligent Electronic Forms*	FileNet Informed Desktop eForms 4.1
Patch reporting	PatchLink proprietary	PatchLink Update
Other software components	see tables I and II	see tables I and II

3.3 Operating System Standards and Compliance Dates

3.3.1 Microsoft Windows

Windows XP Professional shall be completely deployed by June 30, 2005.

Windows XP Home Edition shall not be deployed.

Windows 2000 and earlier versions shall be removed by June 30, 2005.

3.3.2 Mac OS

Mac OS X 10.3.4 (or later) shall be completely deployed by December 31, 2004.

Mac OS 9 may continue to be installed along with Mac OS X to support the Classic environment, but systems should not be configured to boot into Mac OS 9.

Versions of Mac OS X prior to 10.3.4 shall be removed by December 31, 2004.

3.3.3 Unix

Unix systems with no interoperability requirement do not need to comply with the interoperability requirements in this standard. Such systems would include special-purpose Unix systems like

[3] Limited interoperability provided by this standard.
[4] All center CIO's are responsible for providing an interoperable calendar/scheduling solution within their centers.

name servers, compute servers, data acquisition systems, or other components of the overall computing environment.

Several product standards are not available for any Unix system. In order to comply with this standard, interoperable Unix desktops must have some way to access these products. One way to accomplish this would be to use a Citrix ICA client to connect to a Microsoft Windows application server.

The following Unix systems are supported in the agency interoperable environment. Generally, both the current version and prior version of the operating system are acceptable. However, the older version of the operating system must continue to be supported by the vendor, and like all systems, must be kept up-to-date with security patches.

3.3.3.1 Sun Solaris/SPARC

Solaris 9 is current. Updates are listed at:

http://wwws.sun.com/software/solaris/fcc/ucc-sol9updatesum.html

Updates come out approximately quarterly.

3.3.3.2 SGI IRIX/MIPS

IRIX 6.5.25 is current. IRIX update releases are made quarterly, and generally IRIX systems should be kept up-to-date with these maintenance updates.

Security patches will be available for the three previous IRIX update releases (i.e., for one year), in cases where it is not feasible to install the full maintenance overlays.

Versions of IRIX prior to 6.5 are not supported in the agency interoperable environment.

SGI provides information about IRIX releases at:

http://www.sgi.com/software/irix/releases.html

3.3.3.3 Red Hat Linux/x86

Red Hat Enterprise Linux WS 3 is the current version and is described at:

http://www.redhat.com/software/rhel/ws

3.3.3.4 IBM AIX/POWER

AIX 5L 5.2 is current is the current version and is described at:

http://www-1.ibm.com/servers/aix/os/52desc.html

There is no information about how long AIX 4.3.3 will continue to be available or supported.

3.3.3.5 HP Tru64/Alpha

Tru64 Unix 5.1b is current.

The future roadmap for Tru64 Unix from HP indicates support until at least 2006. HP proposes migration to HP-UX on Itanium. Additional details can be found at:

http://h30097.www3.hp.com

3.3.3.6 HP HP-UX/PA-RISC

HP-UX 11i is current, and is described at:

http://www.hp.com/products1/unix/operating/index.html

3.4 Microsoft Office Compliance Dates.

Microsoft Office deployment deadlines for all interoperable Windows and Mac OS systems are as follows:

3.4.1 Microsoft Windows

Microsoft Office 2003 Standard Edition shall be completely deployed by June 30, 2005.

Microsoft Office XP and earlier versions shall be removed by June 30, 2005.

3.4.2 Mac OS

Microsoft Office 2004 Standard shall be completely deployed on Mac OS X systems by June 30, 2005.

Microsoft Office v. X and earlier versions shall be removed by June 30, 2005.

3.5 Operating System Configuration Guidelines

The Federal Information Security Management Act (FISMA) requires all Federal agencies to utilize a consistent set of operating system and application configuration guidelines. Agency-wide guidance is provided in the NASA CIO letter, *Center for Internet Security (CIS) Consensus Benchmarks*, dated 02 September 2004 in which Centers are directed to use the Center for Internet Security's (CIS) Consensus Benchmarks. Technical guidance regarding specific levels of CIS Benchmarks for NASA systems are being worked and will be made available at:

http://desktop-standards.grc.nasa.gov/CIS

3.6 Section 508 Compliance Requirements

Software products procured after June 21, 2001 must be in conformance with Section 508 of the Rehabilitation Act. Complete information and guidance on addressing Section 508 requirements is available at:

http://www.section508.nasa.gov

As of the publication date for this document, conformance with Section 508 could not be verified for all recommended software products.

3.7 FIPS 140-2 Compliance Requirements

NASA will adhere to the guidelines and recommendations of the National Institute of Standards and Technology as required by the Federal Information Security Management Act, particularly

as they apply to computer security and encryption technology for desktop hardware and software. More specifically, NASA will comply with Federal Information Processing Standards (FIPS) 140-1 and 140-2 as applicable, validated encryption modules become available.

NASA application developers and service providers are reminded that whenever cryptographic-based security systems are used to protect sensitive information in computer systems, the cryptographic modules utilized must be FIPS 140-2 compliant as validated by NIST[5]. A current list of validated products can be found at:

http://csrc.nist.gov/cryptval/

The following products mentioned in NASA-STD-2804 have been validated by a NIST-accredited testing laboratory and may be appropriate to protect sensitive information with cryptography under specific conditions:

Product	Validate Module	Certification	Comments
Microsoft Internet Explorer	Kernel Mode Cryptographic Module for Windows XP	#241	Single User Mode, FIPS 140-1
Microsoft Outlook	Outlook Cryptographic Provider	#110	Single User Mode, FIPS 140-1, S/MIME
Entrust PKI Software	Entrust Security Kernel Version 7.0	#308	FIPS 140-1, When operated in FIPS Mode
F-Secure SSH	F-Secure® Cryptographic Library™ for Windows	#437	FIPS 140-2, When operated in FIPS Mode, Single User Mode.
Citrix ICA Client for Windows	Kernel Mode Cryptographic Module for Windows XP	Not Validated	Uses MS Windows FIPS Crypto Module

3.8 Future Interface and Product Standards.

The NASA desktop standards group is working to ensure interoperability at the highest possible revision of products included in the interoperability software suite. Systems conforming to the interface and product standards defined herein will meet any future interoperability requirements established by the Agency CIO.

4 REVIEW AND REPORTING REQUIREMENTS

4.1 Interoperability Maintenance Reporting

Each Center CIO will provide the NASA CIO with an annual progress report, outlining the progress in maintaining minimum interoperability access for each NASA employee.

4.2 Interoperability Reporting

Each Center CIO will establish the necessary processes and tools, both manual and automated, to report on an annual basis to the NASA CIO the hardware and software configuration of all workstations and file servers at their respective Centers. These data will contain sufficient information to ascertain if the workstation or server supports NASA employees or is Government-furnished equipment to a contractor, whether the equipment is required to be interoperable, and a description of the hardware architecture/environment. The report will specify the number of NASA employees that do not have access to interoperable workstations.

[5] Federal Information Processing Standards Publication 140-2, *Security Requirements for Cryptographic Modules*

4.3 Interface and Product Standards Review Reporting

This standard will be reviewed and updated on an as-required basis, not to exceed 6-month intervals. Office automation software standards will be updated as required.

5 DURATION

5.1 Duration

This standard will remain in effect until canceled or modified by the NASA CIO.

6 SUPPORTING DOCUMENTS

6.1 Supporting Documents

Supporting documents and additional information related to this standard may be found at:

http://desktop-standards.grc.nasa.gov

Table I—Other required functionality

Feature	Recommended software, by platform		
	Windows	Mac OS X	Unix
ftp client	FTP Commander 7.2	Fetch 4.0.3	bundled
news reader	Mozilla 1.7	Mozilla 1.7	Mozilla 1.7
viewer for GIF and JPEG images	use web browser	bundled	use web browser
File archive extractor/creatpr	WinZip 9	StuffIt Standard	InfoZIP
anti-virus software	Norton Anti-virus	Norton Anti-virus	not available
QuickTime player	QuickTime 6.5	bundled QuickTime 6.5	xanim (limited functionality)
Internet audio/video player	RealOne Player	RealOne Player	RealPlayer Basic
Windows Media Player	Windows Media Player 9	Windows Media Player 9	not available
Macromedia Flash player	Macromedia Flash Player 7	Macromedia Flash Player 7	Macromedia Flash Player 6 (Except Irix, which is still only at version 4)
Macromedia Shockwave player	Macromedia Shockwave 10	Macromedia Shockwave 10	not available
Macromedia Authorware player	Macromedia Authorware Web player 7 Full	Macromedia Authorware Web player 7 Complete	not available
Java run-time environment	Sun JRE 1.4	Sun JRE 1.4 (bundled)	Sun JRE 1.4
Web conferencing	WebEx	WebEx	WebEx
PKI software	see table III, PKI software		

Note that Table I specifies only **functionality**. Software products and versions other than the ones listed in the table may be used to provide the required functionality.

Table II—Optional useful functionality not required for interoperability

Feature	Recommended software, by platform		
	Windows	Mac OS X	Unix
ssh client[6]	F-Secure SSH	bundled	bundled or OpenSSH
secure file transfer	FileZilla	RBrowser	bundled or OpenSSH scp/sftp
3270 client	QWS3270 3.1.4	tn3270 X 3.1.1	x3270 3.3.2p1
PC emulation	VMware Workstation 4.5	VirtualPC 6.1	VMware Workstation 4.5
Windows application execution environments			CrossOver Office
X window system server	Exceed 7.1	Apple X11	bundled
NFS client software	NFS Maestro 7.1	bundled	bundled
PostScript previewer	Ghostscript	bundled	Ghostscript
PDF writer	Adobe Acrobat 6	bundled	Ghostscript (ps2pdf)
Data conferencing/T.120 client	Microsoft NetMeeting	No recommendation	SunForum (Sun), SGImeeting (SGI)
Business graphics	Visio 2003	No recommendation	No recommendation

[6] A client which supports SSH protocol version 2 is required.

Table III—PKI software

Component	Version, by platform			
	Windows	Mac OS X	Mac OS 9	Unix
Entrust Entelligence	7.0	6.2	5.1	6.0
Entrust Express				
for Eudora	Entrust Express for Eudora	Entrust Express for Eudora (Eudora Pro 5.2.1 and later)	Express for Eudora 5.1 (for Eudora Pro 4.3.2)	not applicable
for Microsoft Outlook	Entrust Express 7.0 for Outlook (for Outlook 2003 and Outlook 2000 SP3 [corporate mode only], Outlook 2002 SP2 [hotfix 814134, 816477, 829346])	not available	not available	not applicable
ICE (with True Delete)	7.0	not available	not available	not available
Entrust Direct[7]	6.1 or TruePass 7.0	not available	5.0.2	not available

[7] Entrust Direct supports only specific versions of Netscape and Internet Explorer. Contact the Principal Center for IT Security for an up-to-date list.